

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Torsten Gottschalk-Gaudig et al.

Serial No.: 10/738,543

Filed: December 17, 2003

For: Water-Wettable Silylated Metal Oxides

Attorney Docket No.: WAS 0611 PUS

Group Art Unit: 1715

Examiner: Elena Tsoy Lightfoot

**REPLY BRIEF UNDER 37 C.F.R. § 41.41**

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Sir:

This Reply Brief is in response to the Examiner's Answer mailed on January 4, 2011 for the above-identified patent application.

Appellants wish to comment briefly on some of the comments presented in the Examiner's Answer.

On pages 4 (bottom) and 5, the Examiner makes the unfounded and conclusory statement that the methanol number and contact angle  $\theta$  is determined by the number of free surface silanol groups. This is incorrect and the Examiner offers no support for this conclusion. The claims require six requirements to be met, and these requirements are not interdependent variables. It is well known that silicas with the same surface silanol content can have widely varying degrees of methanol number, carbon content, contact angle, etc. That is why six claim limitations are required, not just one. If the Examiner believes otherwise, the burden is on the Office to present evidence in support of its position. Conclusory statements cannot take the place of evidence. *In re Soli*, 317 F.2d 941 (CCPA

1963). At best, the Office's position regarding the claim limitations is based on inherency. However, inherency is not applicable to rejections under 35 U.S.C. § 103(a), *In re Shetty*, 566 F.2d 81 (CCPA 1977), and even in rejections under 35 U.S.C. § 102(b) where inherency is relevant, the inherency must be certain, *i.e.* must occur 100% of the time, not merely possibly or even probably. *In re Robertson*, 169 F.3d 743 (Fed. Cir. 1999). That is certainly not the case here. The case of *In re Evanega*, 829 F.2d 1110 (Fed. Cir. 1987) should also be noted: when evaluating obviousness, all claim limitations must be evaluated, and "[i]n this respect, the mere absence from the reference of an explicit requirement of the claim cannot reasonably be construed as an affirmative statement that the requirement is in the reference." The claim limitations of carbon content, mol ratio of silylating agent, contact angle, and methanol number are not disclosed by *Endo* or the other references, alone or in combination, nor are they inherent, even if inherency did apply.

On page 8 of the Answer, the Office alleges that "*Endo* indicates nowhere spherical colloidal silica particles." This is incorrect. *Endo* cites preparation of his particles by wet chemical methods, which only produce spherical colloidal silica particles such as those illustrated on page 7 of the Appeal Brief. How possibly can the Office contend otherwise?

Also on page 8, the Office indicates, and Appellants agree, that the large colloidal silica particles are used to form "protrusions" from the polyester surface. It is noted that fumed silica, as illustrated on page 12 of the Appeal Brief, will not form such protrusions due to the small secondary particle size and the irregular, chain-like structure of these secondary particles. These cannot "stick out" from the polymer surface as can a large spherical particle, but will align themselves with the surface itself, due to the attractive forces between the particles and the polymer surface (lowest energy configuration). It would contravene all scientific principles to expect that these elongate particles would bond to the polymer only at one end with the rest sticking out into space. This is why *Endo* states that fumed silica is not satisfactory for his purpose: fumed silica will not create *Endo's* "protrusions."

On page 5 of the Answer, the Office alleges that *Endo* envisions methods other than the wet chemical method, because the machine translation (the Office acknowledges that this is a machine translation) states that the wet method "can be" utilized.

The office infers that this means that other methods can be used as well. However, that is not correct. First, because this is a machine translation, and not a translation by a human translator fluent in both Japanese and English, “can be” cannot be taken as necessarily correct. A real translator might have translated the relevant portion as “a wet method is used.” Second, if one “can” do something, it does not logically follow that one “can” do something else. A traveler on a road, coming up to a side road existing only on the left, “can” turn left. It does not mean he or she can also turn right.

It is also not true, as suggested by the Office, that any method of preparing *Endo*’s particles can be used, provided they meet the particle size, BET surface area, and surface silanol group content. All of the ranges cited by *Endo* encompass virtually the entire range of particle sizes, BET surface area and surface silanol content of all silicas, and actually exceed these ranges, there being no way to elevate the surface silanol content above the theoretical maximum of 8 SiOH/nm<sup>2</sup> (see *Iler*, cited on page 8 of the Appeal Brief). *Endo* himself indicates that the hydrophobicized silicas of the prior art, (which must, of necessity meet all the requirements of particle size, BET surface area, and surface silanol content due to the impossibly broad ranges of *Endo* for these parameters), are insufficient. See *Endo* at paragraphs [0005] and [0006]. Hydrophobic fumed silica HDK® H15, a product of Wacker Chemie, has been on the market for many, many years, has been widely used in plastics and elastomers as a reinforcing filler, has a surface silanol content of about 1 SiOH/nm<sup>2</sup>, a BET surface area of ca. 120, a carbon content of 1.0 wt. %, and a particle size > .1 μm, and thus falls within the ranges cited by *Endo*. However, this silica is hydrophobic, not partly hydrophobic, as it is not wet at all by water and an aqueous dispersion cannot be prepared. *Endo* indicated that such prior art silicas are unacceptable. *Endo* clearly envisioned only wet method colloidal silica, not fumed silica. The fact that HDK® H15 is hydrophobic and not partly hydrophobic, yet meets the carbon content and silanol content claimed by Appellants is further evidence of why there are six parameters claimed and not just one or two. The silica must meet all the limitations. Meeting only one or two does not make the silica partly hydrophobic as claimed, of necessity. This is further evidence that *Endo* does not disclose the missing claim limitations of methanol number (<30) or contact angle  $\theta$ . These are clearly not inherent merely because the surface SiOH content is met, as alleged by the Office on page 4 (bottom) of the Answer.

At the top of page 11, the Office refers to Appellants' specification as describing partly hydrophobic silicas of both wet process-and pyrogenically-derived silicas. This is true, but irrelevant. It is the claimed invention which is being examined, not Appellants' specification. It is true that Appellants' claims were amended to overcome *Endo*. However, that was done because partly hydrophobic colloidal silicas are not important to Appellants commercially. Appellants still disagree that *Endo* even discloses colloidal silicas meeting the remaining six claim limitations, as discussed earlier. Amendment of the claim was done to expedite prosecution.

At the bottom of page 11 to top of page 12 of the Answer, the Office attempts to modify the machine translation by inserting a word which simply is not there. If it is the position of the Office that the machine translation is incorrect, then the Office should have submitted the *Endo* patent to a human translator to ascertain the correct meaning. Appellants submit, based on *Endo*'s description of the prior art, including prior use of silicas, his description of only a wet chemical method for producing his particles, and the machine translation of paragraph [0012], that the clear import to one skilled in the art is that *Endo* teaches away from the use of fumed silica of any kind.

On page 19 of the Answer, the Office indicates that claims 16, 18, 19, and 33 are not separately patentable, "because they are directed to silane (I) having various *optional* radicals." That is not the case. While in claim 15, from which claims 16, 18, 19, and 33 ultimately depend, the radicals  $R^1$  may be varied, or a silane (I) or organopolysiloxane (II) or mixture thereof may be used, in each of claims 16, 18, 19, and 33, these claims require the enumerated hydrophobing species. They are not "optional" as alleged by the Office. Claim 19, for example, dependent on claim 17, if rewritten as a combination of these claims, would read:

19. (Rewritten) The particles of claim 15, wherein said silylating is performed with an organosilane of the formula



where n is 1, 2, or 3, or a mixture of these organosilanes, wherein each  $R^1$  individually is selected from the group consisting of

methyl, ethyl, propyl, butyl, pentyl, hexyl, octyl, decyl, dodecyl, hexadecyl, octadecyl, phenyl, biphenyl, naphthyl, benzyl, ethylphenyl, tolyl, and xylyl radicals;


X each independently being halogen, a nitrogen radical,  $OR^2$ ,  $OCOR^2$ , or  $O(CH_2)_xOR^2$ .

All of the  $R^1$  in claim 19 are non-functional, and thus not coupling agents. These are not “optional,” as indicated by the phrase “silylating is performed with. . . ,” but required. Claims 16, 18, 19, and 33 are indeed separately patentable.

Appellants respectfully submit that neither *Endo* nor its combination with the remaining references teach or suggest the claimed invention. The particles of the references are for entirely different uses, where methanol number, contact angle  $\theta$ , and other requirements as well are totally unimportant. The claimed partly hydrophobic silicas have the unique and surprising ability to stabilize O/W and W/O emulsions without the use of a surfactant, a property not remotely relevant to any of the references. None of the references, alone or in combination, describe a partly hydrophobic silica meeting all six of Appellants’ claim limitations, whether literally or by inherency. Reversal of all rejections of record is respectfully solicited.

Respectfully submitted,

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